

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Gebhard Zobl, et al.
Applic. No. : 10/533,560
Filed : May 20, 2005
Title : Process for Producing a Molding
Examiner : Russell Kemmerle, III
Group Art Unit : 1791
Docket No. : SB-514
Customer No. : 24131

**DECLARATION UNDER 37 CFR § 1.132
IN SUPPORT OF NON-OBVIOUSNESS**

I, Dr. Lorenz S. Sigl, do hereby declare the following:

1. I am currently employed by Plansee SE, Reutte, Austria as the head of the department "innovation services." I am an expert in the field of powder metallurgy and ceramics processing and sintering.
2. I hold a doctorate from the Montanuniversität Leoben, Austria (1985) and I researched and wrote my doctoral thesis at the Max-Planck-Institut für Metallforschung in Stuttgart, Germany (1982-1985).
3. I did post-doctoral research from 1986 to 1987 at the Materials Department of the University of California at Santa Barbara, CA.
4. I hold a post-doctorate degree in the area of structural ceramics from the Montanuniversität Leoben, Austria (1998) and I researched and wrote my postdoctoral thesis at Elektroschmelzwerk Kempten GmbH, Germany (1988-1997).
5. I have authored or co-authored to date more than (98) publications, including multiple patents, 42 articles in various int'l technical journals, 39 articles in meeting publications, and two contributions to printed books.

6. I am familiar with the disclosure, subject matter, and currently pending claims of U.S. Patent Application No. 10/533,560 (the '560 Patent Application).

7. Based on the facts set forth below, it is my professional expert opinion that the method described and claimed in the '560 Patent Application is an important contribution to the field of powder-metallurgical processing.

8. It is further my professional expert opinion that the '560 Patent Application describes and claims a valuable and beneficial process that was not previously known or obvious from the prior art.

9. For reasons set forth below, it is my opinion that the prior art of record in the patent application does not contain any teaching or suggestion that should render the claims of the '560 Patent Application unpatentable.

10. I have familiarized myself with the reference teachings Yoshida et al. (US 6,660,420, "Yoshida"), Koga (US Patent 6,517,338), and Quadakkers et al. (US 5,733,682, "Quadakkers"). I understand that the claims of the '560 Patent Application have been rejected over these teachings under 35 U.S.C. § 103.

11. Yoshida produces his separator plates from graphite powder and thermosetting resin. Graphite powder has very different properties from, and its processing characteristics are not comparable with, Fe-based powders with a high content of Cr. Furthermore Yoshida describes a two stage pressing operation which is different from the two stage pressing operation according to the '560 Patent application.

Yoshida cold presses the complete separator in a first pressing stage into a shape similar to a final molded shape. In a second pressing stage Yoshida presses the complete separator to the final molded shape.

According to the '560 Patent application in a first pressing stage only the basic body as far as the transition regions of the elevations of the interconnector is pressed to the final shape and in a second pressing stage the elevations are pressed to the final shape whereby the angle of inclination of the elevations is increased. There is no suggestion from Yoshida to press a separator in such a way.

12. Quadakkers describes separators (interconnectors, bipolar plates) for fuel cells that are formed of chromium-containing alloys. As mentioned by Quadakkers, the state of the art knows of two processes that allow forming of chromium-containing alloys to near-final-shape, namely, MIM (metal injection molding) and WPP (wet powder pouring). It is my professional opinion that Quadakkers describes the prior art correctly. In other words, those of skill in the pertinent art had at their avail only MIM and WPP as the available processes for molding Cr alloy powders to near-final shape.

13. Koga pertains to graphite powder processing as well. Koga would not be considered pertinent by one of skill in the art concerned with Cr-alloy processing and particularly not with pressing high-Cr content powders to near final shape. Graphite powders and Cr-powders behave entirely differently in the context of press compaction.

14. Persons of ordinary skill in the art of powder metallurgy would not have used a known pressing method to form interconnectors or similar moldings with a complex shape in a near final shape from alloys with a high Cr-content, i.e. > 20 % by mass. As represented in DIN 30910, iron-based sintered steels (stainless) are formed with a Cr content of 16 – 19 % by mass (AISI 316, AISI 430) or of 11 – 13 % (AISI 410). The resulting structural parts are porous parts including highly porous components such as filters, see DIN 30910, part 2 (*sintered metals for filters*), part 4 (*materials for structural parts*). High-density sintered metals or hot-forged sintered steels for structural parts, however, are specified with a Cr content of 0.1 – 0.25 % by mass, see, DIN 30910, part 6 (*sinter-forged steels*)

15. It is my professional opinion that the specifications of DIN 30910 explicitly teach that a Cr content of, say, 16 – 19 % by mass results in a structural part with a high degree in porosity (pore diameter of 10-80 μm , DIN 30910, part 2). A resultant structural part cannot be used as an interconnector for a fuel cell.

16. It is also my professional opinion that, according to DIN 30910, structural parts with a requisite high density such as an interconnector for a fuel cell can only be sinter-forged with known methods from powders having a Cr content of no more than 0.25 % by mass.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the above-referenced application or any patent issuing thereon.

July 23, 2008
Date

Lorenz S. Sigl
Dr. Lorenz S. Sigl